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and Pococke foundations, amounted to fifty-eight, and were capable of containing about two thousand seven hundred children. It is certain however that this number was never actually accommodated in them at any one time; and, indeed the entire number of schools never existed together, as several of them had been suppressed, or otherwise discontinued, before the latest of them had been established. This was occasioned generally by the local disadvantages of their situation, and in some instances by the resumption of lands which had been granted for their support. The number of those, of all descriptions, remaining at present, is thirty-nine; in which there appear, by the last returns, to have been two thousand two hundred and fifty-one children.

In the year 1786, the funds of the society were augmented by the estates of the late John Rogerson esq. who had directed in his will that they should be sold, and the purchase money, after paying certain legacies and other bequests, be vested in the incorporated society. It appears, however, that only so much of his estates was sold, as was sufficient for discharging these bequests, and the society obtained possession of the remainder, which produced at that time thirteen hundred and fifty-nine pounds fourteen shillings and one penny per annum, but have since been raised to seventeen hundred and seventy pounds. In 1789, the society succeeded to an estate in the county of Louth, at present producing above three hundred pounds per annum, under the will of the late dean Stewart, dated in the year 1774, which directed that on failure of issue of the immediate devisees, it should be vested in the incorporated society, for the purposes therein expressed. There have been other smaller bequests and donations of lands and rent charges for the support of particular schools, amounting in the whole to about two hundred and thirty-eight pounds per annum; and the profit rent of the lands, held by the several school-masters under the society, amounts to about one hundred and eighty pounds per annum. There is also an annual grant of two hundred and fifty pounds made to the society, by the govern-

ors of Erasmus Smith's schools, for the support of the charter school of Sligo. In the year 1790, a Dutch nobleman, resident in London, Baron Vryhouven, bequeathed to the society a great part of his funded property, amounting to fifty-six thousand six hundred and fifty-six pounds stock in the three per-cent. consols, and producing an interest of about seventeen hundred pounds per annum. And about the same time an unknown benefactor transferred to the society, stock to the amount of forty thousand pounds in the 4-per-cents. producing about sixteen hundred pounds per annum. The entire produce of these several funds and estates bequeathed to, and vested in the incorporated society, for the sole and express purpose of educating poor children in the Protestant religion, and apprenticing them to Protestant masters, amounted in the last year (exclusive of the parliamentary grant) to £9765 9 7 per annum.

To be continued.

To the Editor of the Belfast Magazine.

OBSERVATIONS ON THE NATURE OF SOILS, WITH THEIR MODE OF IMPROVEMENT.

SIR,

I SEND you the following observations on the nature of Soils, with the mode of improving the same, according to the method at present adopted by every intelligent farmer in this country: hoping it may stimulate others of your Correspondents, who are perhaps better versed in the latest discoveries in philosophy, and chemistry, to turn their attention towards this subject; which is of the utmost importance to every practical farmer in the management of their farms; and though it cannot be supposed that every farmer can be a philosopher, or an adept chemist, yet there are none who may not make themselves acquainted with the nature of the soil which they cultivate, relative to its component parts; and by judicious and proper treatment to render it (as far as is in his power) prolific in the production of vegetables of every kind.

In order that some of your readers may the better understand what may

be hereafter mentioned respecting the properties of the primitive kinds of earths which compose the different soils, it may be necessary to consider what chemists inform us respecting the origin of vegetable productions in general: and also of the properties of the different kinds of airs, acids or salts, which are so essential for the support of plants and vegetables.

By a number of chemical experiments it has been ascertained that the basis of all earthly productions is the carbonic acid, or fixed air, and heat or fire; these compounded with hydrogen or inflammable air, produces the essential oil, with which all vegetables abound, consequently soils which contains this essential oil, are the best adapted for cultivation.

The carbonic acid, or fixed air, is a combination of oxygen and pure charcoal, of which the charcoal forms rather more than one sixth, it is found in a state of gas on the surface of certain waters, and in subterraneous places, and produces many sudden deaths, at the breaking into old coal-works, and in opening of cellars where any kind of fermentation has taken place.

Oxygen has its name from its acidifying quality; every acid is a combination of this gas, with some elementary substance or base; it has also been called the air of fire, because combustion never takes place without it; and vital air because it is that part of the air which is absorbed in the lungs for the support of life.

Nitrogen gas is so called, from its being the radical of nitrous acid, or aquafortis; it is also called mephites and azote, from the property if breathed alone, of depriving animals of life. Nitrogen is that part of the air, which is respired from the lungs: but that which is absorbed by plants and vegetables, they respire the oxygen.

Hydrogen has its name from its property of producing water, it is also called inflammable air, from its property of burning or exploding with vital air; it is not proper for respiration, yet it has not the sudden mortal effects of nitrogen. In the formation of air, oxygen is a little

more than a quarter of the compound, the rest is nitrogen: in the composition of water, hydrogen is not the one sixth part of the fluid, the rest is oxygen.

Chemists inform us that the primitive earths which enter into the composition of soils, are seldom found uncombined; besides their being mixed with acids or salts, they are constantly mixed with each other, and form masses of greater or less magnitude, and various hardness, according to the nature of the earths, their state of division, and the character of the foreign substances which are combined with them, such as irons, bitumens, &c. Chemists, by decomposing these masses have succeeded in discovering nine different kinds of earthy elements,* but the earthy elements most extensively distributed and which are best known to most farmers; consists of four in number, namely, calcar, chalk or limestone; argil, clay or alumine; magnesia or soapy earth; and silex, or sand.

Calcar, or calcareous earth, contains great quantities of the aerial acid, or fixed air, and is the matrix of all earthly productions: as without it no vegetable will grow; but not having of itself any alkali, will not be productive unless mixed with other earths; it hastens the fusion of aluminous, magnesian, and silicious earths.

Argil, or argillaceous earths, when pure, is always defective in the carbonic acid, or fixed air, but is of the greatest importance to all vegetables, not only by its quality of retaining water, but also for the alkali which is necessary to all plants.

Magnesia, or soapy earth, contains an oily substance composed of fixed air, and water and is therefore of service in the improvement of calcareous and argillaceous soils.

Silex, or sand, contains little that is productive of life; but having an affinity to alkali, is of use in correcting that of argillaceous, or clay soils.

* For an account of these different kinds of earths, with the discoveries of the same, see vol. II, of this Magazine, page 349, and 350.

Although in the composition of soils, the proportion of these earths varies according to the local circumstances of the ground, and climate of the country, as where calcareous soils abound, the air is generally humid; whilst on the contrary silicious earths are principally the produce of hot climates. By a number of chemical experiments, made in Sweden, by the celebrated Bergman, it has been found that the best soil for the purpose of agriculture, consists of four parts of argil, or clay, eight of silicious earth, or sand, two of calcar, chalk, or lime, and one of magnesia, or soapy earth.

Though the general part of farmers, in this country, cannot account, on chemical principles, for the manner they improve their farms; yet nevertheless the progress of rural improvement and cultivation has undergone these few years back has been very considerable. This may be attributed to the increased attention paid to the management of their manures, and also to liming, soiling, draining, &c.

The nitrogen gas which constitutes one of the nutritious principles of plants and vegetables, is more abundantly afforded by the decomposition of vegetables, and the dung of animals, than by any other means; therefore great pains is taken to increase the quantity, by mixing up their dunghills with the scouring of drains, scrapings off the streets, &c. and letting the whole ferment together, which fermentation is accelerated, and the manure improved, by their scooping back occasionally from a reservoir or place appointed to receive the same, the urine, and other substances, which oozes out of their dunghills, this method not only increases the quantity but is found to give as good crops of potatoes, and other kinds of grain, as when dung alone is employed. The following is the method generally adopted in improving the following kinds of soils.

Calcareous, chalk, or limestone soils, are considered to be hot and drying, they receive water freely, but give it too quickly; when limestone soils are mixed with a sufficient quantity of other earths, they are the most friendly to vegetable productions;—but when otherwise, in dry weather,

they become too hard, and in wet weather become too loose and moist, therefore, are improved by soiling with clay and magnesian earths, and also by manuring with animal and vegetable marles, where the same can be found, but where marle cannot be found by manuring sparingly with lime; which practice is lately began to be adopted in this country and is found to fertilize the soil by replenishing it with the necessary quantity of fixed air required by the crops, and which the limestone gravel cannot afford: this and all other kinds of soils require to be manured with dung compost, every third or fourth year, and set with potatoes in the lazy-bed method, or if the ground is weedy, and full of quicken or couch grass, in the drill method, as the frequent ploughings in dressing up potatoes in this way, generally causes the weeds and grass to ferment and rot, but if this method be often repeated it is found to be prejudicial to light soils, by making them to loose, consequently not consistent enough to retain the aerial acid or fixed air; rolling might be of service in this case.

Argillaceous, or clay soils, are of various kinds, and are considered to be moist and cold, and absorb the water, but do not communicate it. Clay soils also abounds in springs which overflow the ground, and render it sterile: owing to spring water being always impregnated with foreign substances (such as iron, copper &c.) which are hostile to vegetation. The first step therefore taken in improving soils of this kind (or any kind of soils where springs are) is to dry the same, by drains, and trenches, or closed sewers, made in proper places, and where there is not a proper fall for the rain-water, by leaving open sewers to carry off the same. Clay soils (as before mentioned) are always defective in the fixed air; therefore frequent limings are necessary; by this means the clay will become mellow and divided, at the same time that the drying quality of the lime will be mitigated, and if the clay is predominant and stiff, bog or moor is added along with the lime; but where this cannot be procured, sand or limestone gravel, these with dung have

all a tendency to meliorate soils of this kind, and to give free access to the air to pass through the same, which it could not do was the soil too tenacious or stiff.

Magnesia, or soapy earth, possesses intermediate properties between the foregoing earths, therefore is improved by the introduction of argillaceous and silicious earths with lime.

Sandy soils are hot and dry; the air therefore has an entrance sufficiently easy, but with equal ease leaves the incoherent soil; heavy soils of every description which would heretofore be considered prejudicial to land, are dug for with avidity in the bottoms of ditches and other places for the improvement of light and shallow soils, of this and the calcareous kinds. These heavy soils are by some laid on the ground when raised, adding lime if necessary: and by others made into a compost and mixed with lime, and turned occasionally in order to meliorate and ferment.

Lastly bogs or moorlands, are generally composed of dry and decayed roots of vegetables; and have various kinds of bottoms; some are composed of small particles of granite, interspersed with stones of that description; some have rocky bottoms without a sufficient quantity of earth; whilst others have clay bottoms, and are easiest improved; of the latter kind the bog and moor soils of this country are generally composed and are improved (when the turf is cut off the same within a spading of the clay) by burning, and with the ashes, setting potatoes in the same several times, which mixes the clay with the soil; it is then found to give excellent meadow, when levelled and laid down with grass seeds, and irrigated or manured occasionally with ashes or other composts; but where the clay is too deep to be got to, moory lands of this kind are manured or mixed with weighty soils, which is of service in giving stability thereto to retain the water and fixed air; which is so necessary to the production of grasses and vegetables of every kind and species.

J.D.

Upper Fews, County Armagh, September 4, 1809.

BELFAST MAG. NO XIV.

To the Editor of the Belfast Magazine.

SIR,

IF you deem the following trifle worthy of a place in your miscellany, your insertion of it will much oblige your very humble servant, M.K.

GLANCES FROM DERRY TO GRACEHILL.

When viewed "through the dark postern of time long elapsed," Derry is an interesting place, but presents nothing attractive now, save its beautiful wooden bridge. A most delightful day tempted me to ascend the mail-coach, and highly was I gratified by the fine, and varying views which every moment presented themselves, for two miles from Derry. The river lay under our inspection; now an American vessel spread her white sails to the wind, and floated majestically down the stream; again, a daring little boat, scarce a speck among the waves, caught the passing breeze, and lightly skimmed along the surface of the deep. Here, the wind-mill rivetted our eyes, and there, we gazed with delight on Boom-hall, and its beautiful grounds. After losing sight of the river, the road for several miles runs through a level but uninteresting country; however, even this part of our journey was not without amusement; for as the doors of the houses were crowded with old women and young, to behold the loaded vehicle, our guard (an uncommonly humorous fellow) to the old, made the most obsequious, and to the young the most polite and gallant bows; now, he took off his hat to a cross-looking country fellow, and again he held out a letter to another, and at the approach of the fellow, raised the laugh at his simplicity. From the sameness of a level country, we were relieved by a view of Lough Foyle. On entering a large wood, its solemn stillness was grateful; but *Meg of Wapping*, sung by one of the passengers, destroyed the solemnity of the scene. Whirled through Ballykelly, (a poor straggling village) with the rapidity of Jehu, I glanced at an elegant little church and spire, and in a few minutes came in sight of Newtownlimavaddy, a small town, of rather a respectable appearance; turning the corner of its main street, I was struck by the uncommon beauty of the view;

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